COVALITIN® A NEW DRUG FOR THE TREATMENT OF URIC LITHIASIS

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FUNDAMENTALS OF THE COVALITIN TREATMENT

It is a known fact that the fundamental role of the kidney is to maintain within constant limits the volume and composition of the blood plasma. This function is performed by specific mechanisms acting on the components who's concentration is to be controlled.

Urine formation cannot be considered a process of simple filtration, diffusion or osmosis, since it involves the active participation of the renal tissue.

The study of this process directed our attention to the mineral components of the blood and urine particularly cations and anions. Thus, besides water which represents the main component, we considered the most important cations from a quantitative point of view, i.e. , Na^+, K^+, Ca^{2+}, Mg^{2+}, also Fe^{2+}, Cu^{2+}, Zn^{2+} and Pb^{2+} which occurred in smaller amounts as well as the anions Cl^-, HCO_3^{2-}, HPO_4^{2-}, $H_2PO_4^-$ and SO_4^{2-}. According to the available data these elements and mineral components totalize 310 mEq/liter of which 155 mEq/liter cations and 155 mEq/liter anions.

Under normal conditions the organism reaches an ionic equilibrium which promotes and also reflects its good metabolical activity.

The main function of the kidney, i.e. to maintain within normal

A. Rapado et al. (eds.), *Purine Metabolism in Man-III*

limits the value of the blood components, is performed by specialized mechanisms regulating the concentration and elimination of these components.

Interdependence of ionic concentration, in case of normal blood and urine ion content, is expressed by the ratio :

$$\frac{[Na^+] + [K^+] + [OH^-]}{[Ca^{2+}] + [Mg^{2+}] + [H^+]} = \text{Constant}$$

The study of various types of urolithiasis revealed modifications in the ionic concentration.

According to Le Chatelier's principle "the modification affecting one condition of a system in equilibrium results in the adjustment of the equilibrium such as to diminish the initial modification". Considering the above mentioned principle concentration evaluations of all ions were carried out, which revealed that, the modification in the concentration of one ion brings about a change in all other concentrations, conducting to an ionic disequilibrium. As a function of factors generating it, this disequilibrium - which is characteristic of all types of urolithiasis - results in the excess or deficiency of blood electrolytes which may be of either anionic or cationic nature.

The study of hydro-electric disequilibrium role in the formation of urinary calculi revealed that a certain type of disequilibrium is accompanied by a specific mineralogical structure of the stones. Since renal calculi exhibit a characteristic mineralogical structure, it may be concluded that a fine analysis of this structure could give valuable indications on the nature and type of hydro-electric disequilibrium.

According to our opinion the urinary cations, completely disregarded until now, play in the majority of stone formers a much more important role in the lithogenetic process as compared to anions (i.e. acid radicals). From this point of view urinary calculi may be classified in two groups. The first group comprises the calculi forming compounds with calcium cation as a main component and also ammonium magnesium phosphate which is never found alone but in combination with calcium phosphate. The second group consist of calculi made of organic compounds (cystine, xanthine, uric acid) which are initiated especially by the action of anions.

Basic components of the second group calculi are :

- uric acid, $C_5HN_4(OH)_3$